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ABSTRACT

This document presents an outline for a 135-hour course designed to help the trainee gain the skills and knowledge necessary to become an aviation powerplant mechanic. The course outlines the theory of operation of various fuel systems, fuel metering, induction, and exhaust system components with an emphasis on troubleshooting, maintenance, and repair methods. The aviation powerplant maintenance technician must be able to demonstrate his ability to troubleshoot and repair aircraft engine fuel systems; his ability to check and repair fuel metering systems and the components thereof; his ability to check, service, and repair all sections of an engine induction on both reciprocating and turbine engines; and his ability to check and repair aircraft engine exhaust systems and the components thereof. Behavioral objectives and performance standards are identified for each of the areas of instruction. A 16-item bibliography including two films and a Quinmester posttest sample are included. (KP)

ED 092693

AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

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AVIATION MECHANICS (Power Plant)
(Aircraft Fuel, Fuel Metering, Induction and Exhaust Systems)

Department 48 - Course 9057.02

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DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1971

ED 092693

D A D E C O U N T Y P U B L I C S C H O O L S

1 4 1 0 N O R T H E A S T S E C O N D A V E N U E

M I A M I, F L O R I D A 33132

Course Outline

AVIATION MECHANICS (Power Plant)
(Aircraft Fuel, Fuel Metering, Induction and Exhaust Systems)

Department 48 - Course 9057.02

the division of

VOCATIONAL, TECHNICAL AND ADULT EDUCATION

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Dade County Public Schools
Miami, Florida 33132

Published by the Dade County School Board

Course Description

9057	48	9057.02	Aircraft Fuel, Fuel Metering, Induction and Exhaust Systems
State Category Number	County Dept. Number	County Course Number	Course Title

A foundation course in the theory of operation of various fuel systems, fuel metering, induction system, and exhaust system components. Emphasizes troubleshooting, maintenance and repair methods.

Indicators of success: Successful completion of ALL quinmesters of the Aviation Mechanics (Airframe and Powerplant General) course, Number 9073.

PREFACE

The course outline that follows has been prepared as a guide to help the trainee in the skills and knowledge necessary to become an Aviation Powerplant Mechanic.

This is a course composed of knowledge and skills necessary should the student decide to follow the Aviation Powerplant Mechanic Curriculum leading to a Federal Aviation Agency License.

Trainees desiring to follow this curriculum should first successfully complete those quinmesters of instruction covering the Basic Aviation Mechanic Curriculum and The Aviation Powerplant Theory and Maintenance sections. This course is composed of four blocks of several units each, requiring one quinmester of 135 hours of instruction.

Great emphasis will be placed on the use of lecture, audio-visual aids and instruction sheets of various types. A listing of the Behavioral Objectives which are to be met to earn satisfactory grades is included. Following each unit title will be found, in parentheses, several letters and numbers designating the time spent in terms of theory and shop work. EIT indicates the estimated instructional time, T indicates the time spent in theory or classroom work and L/S indicates the time spent in laboratory or shop work.

The level 1 following a unit denotes that the student must have knowledge of general principles but no practical application, nor manipulative skills. Instruction is given by lecture, demonstration and discussion. The level 2 following a unit denotes that the student must have knowledge of general principles and limited practical application, and adequate manipulative skill to perform basic operations, and instruction is given by lecture, demonstration, discussion and a limited amount of practical application. The level 3 following a unit denotes that the student must have knowledge of general principles and performance of a high degree of practical application and sufficient manipulative skill to accomplish return-to-service operations. Instruction at this level is given by lecture, demonstration, discussion and a large amount of practical application.

This outline has been developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee and the Vocational Teacher Education Service, and has been approved by the Dade County Vocational Curriculum Committee.

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with Suggested Hourly Breakdown

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GOALS

The aviation powerplant maintenance technician must be able to demonstrate:

1. His ability to troubleshoot and repair aircraft engine fuel systems.

2. His ability to check and repair, if necessary, fuel metering systems and the components thereof.

3. His ability to check, service and repair all sections of an engine induction on both reciprocating and turbine engines.

4. His ability to check and repair, if necessary, aircraft engine exhaust systems and the components thereof.

Course Outline

AVIATION MECHANICS (Power Plant)
(Aircraft Fuel, Fuel Metering, Induction and Exhaust Systems)

Department 48 - Course 9057.02

I. ENGINE FUEL SYSTEMS (15 hours)

A. Inspect, Check, Service, Troubleshoot and Repair Engine Fuel Systems
(Level - 3) (EIT-6 hrs) (T-3 hrs) (L/S-3 hrs)
1. Interpret Federal Aviation Regulations Governing Fuel Systems
   a. Fuel tanks
   b. Fuel system plumbing
   c. Fuel system valves
   d. Fuel system strainers
2. Inspect, Check, Service, Troubleshoot and Repair an Engine Fuel System
   a. Tanks
   b. Plumbing
   c. Valves
   d. Strainers

B. Repair Engine Fuel System Components
(Level - 2) (EIT- 9 hrs) (T-4.5 hrs) (L/S-4.5 hrs)
1. Describe the Operation of Engine Driven Fuel Pumps
   a. Types of engine driven fuel pumps
   b. Comparison of pumping capacity of each
   c. Direction of rotation
   d. Operation of pump pressure relief valves
   e. Operation of by-pass valve
   f. Removal and installation of engine driven fuel pumps
2. Describe the Operation of Auxiliary and Boost Pumps in an Engine Fuel System
   a. Types of auxiliary and boost pumps
   b. Location of auxiliary or boost pumps in a system
   c. Removal and installation of auxiliary or boost pumps

II. FUEL METERING SYSTEMS (99 hours)

A. Inspect, Check, Service, Troubleshoot and Repair Reciprocating and Turbine Engine Fuel Metering Systems (Level - 3) (EIT-12 hrs) (I-6 hrs) (L/S-6 hrs)

1. Explain Temperature, Pressure and Humidity Effects on the Operation of a Carburetor
   a. Effect of temperature variations on air density
   b. Effect of humidity on air composition
   c. Effect of altitude on air density
   d. Effect of the above changes on fuel/air ratios
2. Describe the Operation of a Float-Type Carburetor
   a. The theory of combustion
      (1) The composition of gasoline
      (2) The composition of air
      (3) The chemistry of combustion of gasoline in air
   b. Fuel/air ratios - mixtures
      (1) Lean mixtures
      (2) Rich mixtures
      (3) The chemically perfect mixture
   c. The fundamentals of carburetion
      (1) The effect of fluid velocity on pressure
      (2) The effect of fuel vaporization on combustion
   d. The simple float-type carburetor
      (1) The function of the float chamber
      (2) The function of the venturi tube
      (3) Function and location of the discharge nozzle
      (4) Construction and function of the metering jets
      (5) Construction and function of the air bleed system
   e. Mixture controls
      (1) Function of the mixture control system
      (2) Needle type mixture control
      (3) By-pass or airport mixture control
      (4) Back suction mixture control
      (5) Automatic mixture control
   f. The economizer system
      (1) Function of the economizer system
      (2) Needle type economizer valve
      (3) Poppet valve economizer
      (4) Venturi suction economizer
      (5) Manifold pressure economizer

II. FUEL METERING SYSTEMS (Contd.)

g. The idle system
   (1) The need for a separate idle system
   (2) The idle feed system
   (3) The idle air bleed
   (4) The idle discharge nozzle and mixture control
   (5) The idle system of a downdraft carburetor
h. The accelerating system
   (1) The function of the accelerating system
   (2) The accelerating well
   (3) The leather piston accelerating pump
   (4) The moveable cylinder accelerating pump
   (5) The compound or double deck accelerating pump

3. Inspect, Remove and Install a Float-Type Carburetor, Operate the Engine and Adjust Idle Speed and Mixture
   a. Inspect a float-type carburetor installed on an engine
      (1) Security of installation
      (2) Control operation
      (3) Leaks
   b. Remove a float-type carburetor from an engine
      (1) Locate and interpret correct procedure for removing a carburetor from a specific engine
      (2) Disconnect carburetor controls, fuel lines and air inlet ducting
      (3) Remove the carburetor
   c. Install a float-type carburetor on a specific engine
      (1) Locate and interpret installation procedure
      (2) Install the carburetor on the engine
      (3) Connect the fuel lines and pressure check the system for leaks
      (4) Connect and rig the controls
      (5) Install air inlet ducting

4. Identify the Dangers of Excessively Rich and Excessively Lean Mixtures
   a. The dangers of excessively rich mixtures
      (1) Effect of rich mixtures on power
      (2) Backfiring through the exhaust
      (3) Tailpipe torching

II. FUEL METERING SYSTEMS (Contd.)

b. The dangers of excessively lean mixtures
   (1) Effect of lean mixtures on power
   (2) Backfiring through the induction system
   (3) Effect on cylinder head temperature

5. Identify a Pressure Carburetor and a Direct Fuel Injection System and Describe the Operation of Each
   a. The pressure carburetor
      (1) Identifying features
      (2) General description of operation
   b. Direct fuel injection systems
      (1) Identifying features
      (2) General description of operation

6. Compare Continuous Flow Injection and Direct Cylinder Injection
   a. Continuous flow injection
      (1) Principal parts of the system
      (2) Function of the several parts
      (3) Point at which fuel is injected
      (4) How fuel flow is regulated
      (5) Advantages and disadvantages
   b. Direct cylinder injection
      (1) Principal parts of the system
      (2) Function of the several parts
      (3) Point and time at which fuel is injected
      (4) How fuel flow is regulated
      (5) Advantages and disadvantages

7. Inspect, Remove and Install a Pressure Carburetor or Fuel Injection System, Operate the Engine and Adjust Idle Speed and Idle Mixture
   a. Inspect a pressure carburetor or fuel injection system installed on an engine
      (1) Security of installation
      (2) Controls for freedom of operation, wear and length of travel
      (3) Leaks under pressure
      (4) Primer solenoid operation, if installed
   b. Remove a pressure carburetor from an engine
      (1) Locate and interpret correct procedure for removing the carburetor from a specific engine
      (2) Remove the air scoop adapter
      (3) Disconnect controls, fuel lines and electrical connections
      (4) Remove the carburetor

II. FUEL METERING SYSTEMS (Contd.)

c. Install a pressure carburetor on an engine
   (1) Locate and interpret correct installation procedure
   (2) Install necessary fuel line fittings and control arms
   (3) Install carburetor on the engine
   (4) Connect fuel lines and pressure check the system
   (5) Connect and rig the carburetor controls
   (6) Operate the engine and adjust idle speed and idle mixture

d. Inspect a direct fuel injection system
   (1) Security of installation of the master control, pump units, flow divider and injection manifold
   (2) Controls for freedom of movement, wear and length of travel
   (3) Leaks under pressure

e. Remove a direct fuel injection system from a specific engine
   (1) Locate and interpret correct procedure for removing the direct fuel injection system from a specific engine
   (2) Remove the air scoop adapter
   (3) Disconnect the controls
   (4) Disconnect the fuel lines from the master control
   (5) Disconnect the metered fuel lines from the master control to the pump units or flow divider and injection nozzles
   (6) Remove the master control, flow divider and/or pump units
   (7) Remove the injection nozzles

f. Install a direct fuel injection system on an engine
   (1) Locate and interpret the correct procedure for installing a direct fuel injection system on a specific engine
   (2) Install necessary fittings and control arms
   (3) Install the master control, flow divider and/or pump units
   (4) Connect fuel lines to the master control
   (5) Install the fuel injection nozzles

(6) Connect the fuel injection manifold
(7) Connect and rig the operating controls
(8) Pressure check the system
(9) Operate the engine and adjust idle speed and idle mixture

8. Explain the Function of Vapor Separators and Vapor Vents
   a. Vapor separators
      (1) Location of vapor separators in a pressure carburetor
      (2) Function and operation of vapor separators
   b. Vapor vents
      (1) Location in a fuel system
      (2) Function and operation of vapor vents
      (3) Effect of a malfunctioning vent
9. Rig the Fuel Control Unit on a Static Turbojet Engine and Describe Trimming the Engine
   a. Rig a fuel control unit
      (1) Locate and interpret correct procedure for rigging a turbojet engine fuel control unit
      (2) Demonstrate rigging the fuel control unit on a specific turbojet engine
   b. Trim a static turbojet engine
      (1) Function of trimming
      (2) Procedure used to trim an engine
      (3) Effect of foreign object damage on engine trim

B. Overhaul Carburetors
(Level - 2) (EIT-75 hrs) (T-30 hrs) (L/S-45 hrs)

1. Disassemble a Representative Float-Type Carburetor, Identify the Parts and Describe the Function of Each, Trace and Describe the Function of Each of the Fuel and Air Passages
   a. The venturi tube
   b. Barrel size
   c. Metering jets
   d. Main air bleed
   e. Main discharge nozzle
   f. Mixture control
   g. Economizer system
   h. Accelerating pump
   i. Idle feed system
   j. Idle discharge nozzle
   k. Idle air bleed

II. FUEL METERING SYSTEMS (Contd.)

2. Reassemble the Carburetor in Accordance With the Manufacturer's Overhaul Manual
3. Disassemble a Representative Pressure Carburetor, Identify the Principal Parts and Describe the Function of Each, Trace the Air and Fuel Passages and Describe Their Functions.
   a. Venturi tubes
      (1) Impact tubes
      (2) Venturi annulus
   b. Automatic mixture control
   c. Throttle unit
   d. Regulator bodies
   e. Air diaphragm
   f. Mixture control bleeds
   g. Sealing diaphragm
   h. Balance diaphragm
   i. Fuel diaphragm
   j. Idle spring
   k. Poppet valve
   l. Vapor eliminators
   m. Idle valve
   n. Metering jets
   o. Manual mixture control
   p. Regulator fill valve
   q. Power enrichment valve
   r. Power enrichment valve diaphragm
   s. Fuel transfer line
   t. Main discharge nozzle
   u. Accelerating pump
      (1) Vacuum operated
      (2) Throttle operated
4. Reassemble the Carburetor in Accordance With the Manufacturer's Overhaul Manual
5. Interpret and Use Charts and Diagrams to Help Explain Fuel and Air Flow Through the Above Carburetor

C. Repair Engine Fuel Metering System Components (Level - 2) (EIT-9 hrs) (T-4.5 hrs) (L/S-4.5 hrs)
1. Locate, Remove, Clean and Reinstall Strainers in Fuel Metering System Components
   a. Removal and inspection
   b. Cleaning and reinstallation

II. FUEL METERING SYSTEMS (Contd.)

2. Inspect and Describe the Repair of Carburetor Floats
   a. Removal of fuel from a logged float
   b. Repair of floats by soldering
   c. Checking the float for additional leaks
3. Inspect a Float Needle Valve and Seat, Measure and Adjust the Float Level of a Carburetor
   a. Where float level is measured
   b. Effect of fuel specific gravity on float level
   c. Effect of fuel inlet pressure on float level
4. Adjust Poppet Valve Setting of a Pressure Carburetor
   a. Effect of improper valve setting
   b. Use of flow charts
5. Adjust the Fuel Head Power Enrichment Valve of a Pressure Carburetor Using a Test Bench
   a. Time of opening
   b. Rate of opening
6. Inspect a Pressure Carburetor and Describe the Operation Resulting from Clogged Impact Tubes or Ruptured Diaphragms

III. INDUCTION SYSTEMS (27 hours)

A. Inspect, Check, Troubleshoot, Service and Repair Engine Ice and Rain Control Systems
(Level - 2) (EIT-7 hrs) (T-3.5 hrs) (L/S-3.5 hrs)
1. Describe Induction System Icing and Identify the Probable Location
   a. Atmospheric ice
   b. Expansion ice
   c. Evaporation ice
   d. Throttle valve
   e. Discharge nozzle
   f. Carburetor air intake
2. Inspect, Check, Service and Repair a Carburetor Air Pre-Heat System or Hot Spot
   a. Location of heat source
   b. Control of carburetor heat
   c. Effect of carburetor heat on power
   d. Repair of carburetor air heat systems
   e. FAA requirements for heat rise with various engine and carburetor combinations

III. INDUCTION SYSTEMS (Contd.)

3. Describe the Operation of Thermal Anti-Icing Systems for Turbine Engines
   a. Source of heat
   b. Control of air intake heat

B. Inspect, Check, Service and Repair Heat Exchangers and Superchargers
(Level - 2) (EIT-10 hrs) (T-5 hrs) (L/S-5 hrs)
1. Inspection and repair of superchargers
   a. Internal superchargers
   b. Turbo superchargers
2. Types of Gear Driven Superchargers
   a. Single stage
   b. Two stage
3. Inspect, Service and Check a Supercharger System
4. Inspect Heat Exchangers and Describe Methods of Repair
   a. Location of heat exchangers
   b. Method of inspection
   c. Methods of repair

C. Inspect, Check, Service and Repair Carburetor Air Intake and Induction Manifolds
(Level - 3) (EIT-10 hrs) (T-5 hrs) (L/S-5 hrs)
1. Inspect, Check, Service and Repair an Air Intake for a Carbureted Engine
   a. Inspect for cleanliness, damage, missing screws, or loose clamps
   b. Clean, repair damage, replace worn or missing parts, and secure loose clamps
2. Inspect, Check, Service and Repair a Carburetor Heater System
   a. Inspect for damage, worn or missing parts, loose clamps and operation of the heat control valve
   b. Repair worn or damaged parts, replace missing parts, secure loose clamps, and repair exhaust leaks
   c. Reassemble the system, operate the engine and check for proper heat rise
3. Inspect and Service Air Screens or Air Filters in the Engine Air Intake
   a. Inspect for security of installation, contamination and damage
   b. Clean the air filter or screen
   c. Service the filter in accordance with the manufacturer's manual and reinstall

III. INDUCTION SYSTEMS (Contd.)

4. Inspect, Check, Service and Repair an Engine Primer System
   a. Primer pump
      (1) Inspect pump for evidence of leaks
      (2) Check operation of primer pump
      (3) Check inlet and outlet check valves for proper operation
      (4) Check pump locking mechanism
   b. Primer lines and spider
      (1) Inspect lines for physical damage and evidence of leaks
      (2) Check primer spider for security of installation and evidence of leaks
   c. Primer nozzles
      (1) Check nozzles for evidence of physical damage
      (2) Inspect nozzles for proper operation of check valves
   d. Operate primer pump and inspect entire system under pressure
   e. Repair or replace worn or damaged parts

IV. ENGINE EXHAUST SYSTEMS (21 hours)

A. Inspect, Check, Troubleshoot, Service and Repair Engine Exhaust Systems
(Level - 3) (EIT-15 hrs) (T-7 hrs) (L/S-8 hrs)
1. Inspect, Remove, Replace, Adjust and Repair Joints in the Exhaust System
2. Inspect, Remove and Test Exhaust Heaters
3. Identify, Inspect and Describe the Operation of Turbo-Superchargers and Turbo-Compound Engines
4. Describe the Operation and Inspection of Jet Engine Thrust Reverses and Noise Suppressors

B. Repair Engine Exhaust System Components
(Level - 2) (EIT-6 hrs) (T-3 hrs) (L/S-3 hrs)
1. Recognize Materials Used in Exhaust System Components
2. Describe Repair Procedures for Exhaust System Components

V. QUINMESTER POST TEST

BEHAVIORAL OBJECTIVES

BLOCK I - ENGINE FUEL SYSTEMS

A. Inspect, Check, Service, Troubleshoot and Repair Engine Fuel Systems

1. Interpret Federal Aviation Regulations Governing Fuel Systems

Given:

Copies of the applicable Federal Aviation Regulations, manufacturer's service manuals and specifications for the fuel system of a particular airplane.

Performance:

The student will locate and interpret information from the reference publications and describe how the regulations govern strainers, lines, vents, expansion space and sumps of the specific fuel system.

Standard:

The reference information will be interpreted without error. Correct nomenclature and terminology will be used as a part of the description.

2. Inspect, Check, Service, Troubleshoot and Repair an Engine Fuel System

Given:

An operational fuel system including a fuel tank, tank outlet strainers, lines, sump drains, selector valves, main fuel strainer and carburetor or fuel injection system; and the manufacturer's service instructions for the specific system.

Performance:

The student will inspect, check, service, troubleshoot and repair problems introduced into the system by the instructor.

Standard:

The inspection, servicing and repair of the system will be in complete accordance with the service instructions. As a part of the troubleshooting procedure, the student will identify, isolate and correct a simulated problem caused by contamination or vapor lock.

B. Repair Engine Fuel System Components

1. Describe the Operation of Engine Driven Fuel Pumps, Remove and Install a Pump on an Engine

Given:

A vane type fuel pump, a diaphragm type fuel pump and the service information applicable to each type of pump.

Performance:

The student will interpret the service information, identify the parts of the pumps and describe the operation of the fuel pumps. He will remove and reinstall a fuel pump on an engine.

Standard:

The description of operation and the removal and reinstallation will be in full accordance with the service instructions. Correct nomenclature and terminology will be used as a part of the descriptions of operation.

2. Describe the Operation of Auxiliary and Boost Pumps in an Engine Fuel System

Given:

Fuel system diagrams, the service instructions for one specific type of auxiliary or boost pump and a fuel pump of that type.

Performance:

The student will explain the purpose of auxiliary and fuel boost pumps. He will describe the operation of various types of pumps. He will remove and reinstall an auxiliary or boost pump in the fuel system.

Standard:

The explanations and descriptions will include use of the correct nomenclature and terminology. The installation and removal of the pump will be in accordance with the service instructions.

BLOCK II - FUEL METERING SYSTEMS

A. Inspect, Check, Service, Troubleshoot and Repair Reciprocating and Turbine Engine Fuel Metering Systems

1. Explain Temperature, Pressure and Humidity Effects on the Operation of a Carburetor

Given:

Appropriate reference information (charts, visual aids or manufacturer's manuals) that describe the effect of air density on carburetor operation.

Performance:

The student will describe the operation of a carburetor and explain how variations in temperature, pressure and humidity of the air will affect the operation of the engine.

Standard:

The student will correctly interpret charts and reference data. He will use correct nomenclature and terminology throughout the descriptions and explanations.

2. Describe the Operation of a Float-Type Carburetor

Given:

A typical float carburetor incorporating an idle metering system, an accelerating and main discharge system, idle and altitude mixture control systems; appropriate reference information describing the operation and systems of the specific carburetor; an unlabeled line drawing or sketch illustrating the components of the carburetor.

Performance:

The student will interpret information contained in the manual, disassemble the carburetor and label the sketch as a means of identifying the components and system. He will describe the operation of each system; pointing to the passageway of the carburetor, he will trace the flow of fuel and air. He will reassemble the carburetor.

Standard:

Information will be correctly interpreted. Correct nomenclature will be used when labeling the drawing, and correct terminology and phraseology will be a part of all descriptions and explanations. Disassembly and reassembly will be in accordance with the procedure described in the reference publications.

3. Inspect, Remove and Install a Float-Type Carburetor, Operate the Engine and Adjust Idle Speed and Mixture

Given:

An operational engine equipped with a float-type carburetor, appropriate written operating and service instructions for the specific engine and carburetor.

Performance:

The student will inspect, remove and install the carburetor and operate the engine. He will adjust the idle speed and idle mixture.

Standard:

The procedure will be in accordance with the written service instructions. The adjustments will result in an engine operation within the tolerance specified in the operating instructions.

4. Identify the Dangers of Excessively Rich and Excessively Lean Mixtures

Given:

A 20 question matching type examination relating the cause and effect of excessively rich and excessively lean fuel/air mixtures; 10 examples of engine component, that have been damaged by rich and lean mixtures (valves, exhaust manifolds, carburetor heat boxes, etc.) and manufacturer's service manuals.

Performance:

The student will match the described effect with the probable cause and select a typical component that reflects the condition described by the examination question.

Standard:

Fifteen questions will be correctly answered. The student will correctly identify five engine components that show evidence of damage due to incorrect fuel/air mixtures.

5. Identify a Pressure Carburetor and a Direct Fuel Injection System and Describe the Operation of Each

Given:

A typical pressure carburetor; the components of a direct cylinder fuel injection system;

appropriate reference information describing the operation of each system; line drawings, schematics or diagrams of the systems.

Performance:

The student will point to the component or carburetor and name the part. He will interpret information from the reference publications and describe the operation of both systems. He will compare the advantages and limitations of the two systems.

Standard:

Components will be correctly identified by name. Correct nomenclature and terminology will be used throughout the description of operation.

6. Compare Continuous Flow Injection and Direct Cylinder Injection

Given:

Pictures, diagrams, schematics or written information pertaining to the continuous flow method of fuel injection and the direct cylinder injection systems.

Performance:

The student will describe the two systems and will name the components that are required for the operation of each system.

Standard:

Correct nomenclature will be used when naming the components of each system.

7. Inspect, Remove and Install a Pressure Carburetor or Fuel Injection System, Operate the Engine and Adjust Idle Speed and Idle Mixture

Given:

An operational engine equipped with a pressure carburetor or fuel injection system and appropriate written operating and service instructions for the specific engine and fuel metering system.

Performance:

The student will inspect, remove and install the carburetor or fuel injection system and operate the engine. He will adjust the idle speed and idle mixture.

Standard:

The procedures will be in accordance with the written service instructions. The adjustments will result in an engine operating condition within the tolerances specified in the operating instructions.

8. Explain the Function of Vapor Separators and Vapor Vents

Given:

Diagrams, schematics or written information describing the purpose and functioning of vapor separators and vapor vents; unlabeled line drawings or sketches of the vapor return system of a specific model airplane and the manufacturer's manual for that airplane.

Performance:

The student will explain the function of vapor separators and vapor vents as incorporated into a pressure carburetor or a fuel injection system.

Standard:

The drawing will be correctly labeled. Correct nomenclature will be used throughout all descriptions and explanations.

9. Rig the Fuel Control Unit on a Static Turbojet Engine and Describe Trimming the Engine

Given:

A turbojet engine, statically mounted to include a thrust level, fuel control unit and associated instrumentation and linkage necessary to trimming of the engine and written instructions describing the procedures for accomplishing the adjustment.

Performance:

The student will interpret the information, describe and simulate the procedure for rigging the fuel control unit and trimming of a turbojet engine.

Standard:

Reference information will be correctly interpreted. Correct nomenclature and terminology will be used throughout the description of the procedure.

B. Overhaul Carburetors

1. Disassemble a Representative Float-Type Carburetor, Identify the Parts and Describe the Function of Each of the Fuel and Air Passages

Given:

A representative float-type carburetor, incorporating all of the normal carburetor systems, reference manuals and charts.

Performance:

The student will study the parts and systems of the carburetor and orally describe the complete operation of all of the systems.

Standard:

Reference information will be correctly interpreted. Correct nomenclature will be a part of the description.

2. Reassemble the Carburetor in Accordance with the Manufacturer's Overhaul Manual

Given:

The disassembled carburetor and manufacturer's overhaul manual.

Performance:

The student will interpret the manual information and reassemble the carburetor using standard overhaul practices and pertinent inspection sheets.

Standard:

Reference material will be correctly interpreted and the carburetor inspected both internally and externally, following a check sheet.

3. Disassemble a Representative Pressure Carburetor, Identify the Principal Parts and Describe the Functions of Each, Trace the Air and Fuel Passages and Describe the Function of Each

Given:

A representative pressure carburetor, incorporating all normal pressure carburetor systems, reference manuals, charts and check sheets.

Performance:

The student will disassemble the carburetor, study the parts and systems and describe the complete operation of one system.

Standard:

Reference information will be correctly interpreted. Correct nomenclature will be a part of the descriptions.

4. Reassemble the Carburetor in Accordance with Manufacturer's Overhaul Manual

Given:

The disassembled carburetor and manufacturer's overhaul manual.

Performance:

The student will interpret the manual information correctly and reassemble the carburetor using standard overhaul practices.

Standard:

Reference material will be correctly interpreted and the carburetor inspected both internally and externally against typical inspection sheets.

5. Interpret and Use Charts and Diagrams to Help Explain Fuel and Air Flow Through the Above Carburetor

Given:

Charts, diagrams, drawings or similar visual aids illustrating the passageways and internal flow path through float and pressure carburetors, written reference information describing the fuel/air ratios required by the engine at various operating conditions.

Performance:

The student will interpret and use the charts and diagrams to explain fuel and air flow through both float and pressure carburetors.

Standard:

The principles of differential pressure in both fuel and air flows will be correctly explained. Correct nomenclature and terminology will be a part of the explanations.

C. Repair Engine Fuel Metering System Components

1. Locate, Remove, Clean and Reinstall Strainers in Fuel Metering System Components

Given:

A typical aircraft carburetor or fuel metering device incorporating a fuel inlet screen;

manufacturer's service information applicable to the specific unit; and recommended materials, tools and equipment as recommended in the reference information.

Performance:

The student will use and interpret information necessary to identify, remove, clean and reinstall the screens in the fuel metering unit.

Standard:

The procedures, tools and techniques recommended in the service information will be followed without error or omission. The task will be accomplished at a return-to-service standard.

2. Inspect and Describe the Repair of Carburetor Floats

Given:

Five typical floats from aircraft carburetors (two will be unacceptable for return-to-service) representing floats that were made of brass, stainless steel and moulded rubber; reference information describing the inspection and repair of floats.

Performance:

The student will inspect the floats, interpret the referenece information and describe the repair of carburetor floats.

Standard:

The two unacceptable floats will be identified and the reason for rejection will be explained. Reference information will be correctly interpreted. Correct nomenclature will be used as a part of the description of repairs.

3. Inspect a Float Needle Valve and Seat, Measure and Adjust the Float Level of a Carburetor

Given:

A float carburetor with two replacement float needle and valve seat assemblies, one of which is unserviceable; a manufacturer's service manual and recommended equipment necessary to measure and adjust the float level of a carburetor.

Performance:

The student will inspect the needle and seat assemblies and identify the serviceable assembly. He will install the serviceable needle and seat assembly and adjust the float level.

Standard:

All procedures will be in accordance with the information contained in the manual. Information will be correctly interpreted and the adjusted float level will be within specified tolerances.

4. Adjust Poppet Valve Setting of a Pressure Carburetor

Given:

A pressure carburetor properly connected to a standard carburetor flow bench, carburetor flow sheets for the carburetor and instructions for operating the flow bench.

Performance:

The student will interpret the instructional material and flow chart and adjust the poppet valve for correct flow.

Standard:

The reference material will be correctly interpreted and the valve adjusted to flow chart limits.

5. Adjust the Fuel Head Power Enrichment Valve of a Pressure Carburetor Using a Flow Bench

Given:

A pressure carburetor fuel control unit with fuel head power enrichment valve, carburetor flow bench and appropriate flow chart or other pertinent data.

Performance:

The student will interpret the appropriate data and adjust the valve time of opening and check the rate of opening.

Standard:

Reference material will be correctly interpreted and the valve action checked against the manufacturer's information.

6. Inspect a Pressure Carburetor and Describe the Operation Resulting from Clogged Impact Tubes or Ruptured Diaphragms

Given:

Examples of pressure type carburetors, at least one of which will have clogged impact tubes and a ruptured fuel or air diaphragm; drawings or schematic diagrams of the specific carburetor; reference information describing the function of impact tubes and diaphragms within the carburetor.

Performance:

The student will identify the clogged impact tubes and point to the impact tubes as they are identified on the drawing or schematic. He will explain the relationship of the impact tubes to the pressure regulator and automatic mixture control unit of the carburetor. He will explain the effect of a ruptured fuel or air diaphragm on the operation of an engine.

Standard:

The carburetor with the clogged impact tubes will be detected. Reference information will be correctly interpreted and explanations and descriptions will include correct nomenclature.

D. Inspect, Check, Troubleshoot, Service and Repair Water Injection Systems

1. Locate and Interpret Information Pertaining to Water Injection Systems

Given:

Written reference information pertaining to water injection systems.

Performance:

The student will locate information and answer a twenty question multiple choice examination dealing with the effect of atmospheric humidity; depletion of water injection during take-off; variables that affect the water flow and indications of incorrect flow rate; purpose of the derichment valve and the effects of failure of the valve on high power performance.

Standard:

Reference information will be located and fifteen of the multiple choice questions will be correctly answered.

2. Check and Service a Water Injection System with the Proper Fluid

Given:

Necessary charts and other pertinent data pertaining to a water injection system.

Performance:

The student will interpret all available information and describe the checking and servicing of the system.

Standard:

The available information will be correctly interpreted. Correct nomenclature will be a part of the description.

BLOCK III - INDUCTION SYSTEMS

A. Inspect, Check, Troubleshoot, Service and Repair Engine Ice and Rain Control Systems

1. Describe Induction System Icing and Identify the Probable Location

Given:

Unlabeled drawings of an air induction system for supercharged and unsupercharged reciprocating engines and a turbine engine and appropriate texts or manufacturer's manuals.

Performance:

The student will interpret the reference publications and describe the formation of ice in the induction systems of both reciprocating and turbine engines. He will label the line drawings to illustrate the most common location for the build-up of ice in the induction system.

Standard:

Reference information will be correctly interpreted and the illustrations will be correctly labeled. Correct nomenclature will be used as a part of the description.

2. Inspect, Check, Service and Repair a Carburetor Air Pre-heat System or Hot Spot

Given:

A typical carburetor pre-heat system incorporating an exhaust heat muff heater, connecting hose and shutter operated heat box; an intake manifold hot spot; appropriate reference information pertaining to the carburetor heater and hot spots.

Performance:

The student will inspect, check and service the heat muff, connecting duct and heater box and shutter. He will describe the repairs that are normally accomplished and will verify that the shutter of the heat box has full travel.

Standard:

The student will correctly detect any defects that exist in the system. The system will function as it was designed to operate or necessary adjustments will be made by the student to achieve this standard. Correct nomenclature will be used during all descriptions or repairs.

3. Describe the Operation of Thermal Anti-Icing Systems for Turbine Engines

Given:

Written reference information, drawings, or schematics describing and illustrating thermal anti-icing of turbine engine air intakes.

Performance:

The student will interpret the information and drawings and describe the operation of the anti-icing systems.

Standard:

Reference information will be correctly interpreted. Correct nomenclature and terminology will be used to describe the operation of the systems.

B. Inspect, Check, Service and Repair Heat Exchangers and Superchargers

1. Inspection and Repair of Superchargers

Given:

Typical superchargers of the mechanically driven and exhaust turbo types, sufficiently

complete, but not necessarily capable of being operated, so that the supercharger may be inspected in accordance with the manufacturer's manual and the required repairs described.

Performance:

The student will inspect a mechanically driven and an exhaust turbo supercharger. He will make measurements of clearance and visual inspection for defects and describe the repairs as recommended by the manual.

Standard:

Reference information will be correctly interpreted. The inspection and description of repairs will be in accordance with the manufacturer's manual.

2. Types of Gear Driven Supercharger

Given:

Engine manufacturer's service and overhaul manuals covering engines with both single speed and two speed superchargers.

Performance:

The student will locate and interpret the pertinent information concerning the gear driven supercharger and clutches where they apply.

Standard:

The manual information will be correctly interpreted. Correct nomenclature will be a part of the description.

3. Inspect, Service and Check a Supercharger System

Given:

An operational engine or mock-up equipped with a mechanically driven or turbo-supercharger system, appropriate reference information or manuals describing the operation, servicing and inspection of the system, necessary servicing tools or equipment and an unlabeled line drawing of a normally aspirated, a mechanically driven and a turbo-supercharger system.

Performance:

The student will operate the engine or mock-up and check the operation of the supercharger system. He will inspect and service the system as recommended in the reference

publications and label each of the three drawings of the intake manifold systems, identifying the approximate pressures and temperatures that will exist at various positions in the system.

Standard:

The operation and inspection of the supercharging system will be fully in accordance with the reference publications. The temperatures and pressures shown in the drawings will be sufficiently correct that comparisons may be made between the different systems.

4. Inspect Heat Exchangers and Describe Methods of Repair

Given:

Typical aircraft heat exchangers, at least one of which is defective due to cracks, burns or defective radiator core and appropriate reference information and manuals describing the inspection or repair of the specific types of heat exchanger displayed.

Performance:

The student will interpret information contained in the publications and inspect the heat exchangers. He will identify the defective heat exchanger and describe the repair procedure recommended in the manual.

Standard:

Information will be correctly interpreted. The defective heat exchanger will be identified without error or omission. Correct nomenclature will be used to describe the recommended repair.

C. Inspect, Check, Service, and Repair Carburetor Air Intake and Induction Manifolds

1. Inspect, Check, Service and Repair an Air Intake for a Carbureted Engine

Given:

An operational engine provided with a ram air carburetor intake duct, manufacturer's service information pertaining to the inspection, service and repair of the intake ducting.

Performance:

The student will operate the engine as a means

of recognizing normal operation. He will again operate the engine after the instructor has introduced a partial obstruction in the intake air duct and record the symptoms. The student will inspect, check, service and repair the system to correct the obstruction in the intake duct.

Standard:

Operation of the engine, inspection, checking servicing and repair will be in accordance with the recommendations contained in the manufacturer's service information. The intake duct and engine will operate normally following correction of the fault.

2. Inspect, Check, Service and Repair a Carburetor Heater System

Given:

An operational engine that is equipped with a carburetor heater system, manufacturer's service manuals or equivalent written reference information describing the inspection, servicing, adjustment and repair of the carburetor heater system.

Performance:

The student will operate the engine with a carburetor heat control that is improperly rigged. He will record the instrument indications and re-rig and adjust the carburetor heat control.

Standard:

Engine operation will be in accordance with the written reference information. Information will be correctly interpreted and the rigging and adjustment of control travel and response will meet return-to-service standards.

3. Inspect and Service Air Screens or Air Filters in the Engine Air Intake

Given:

An engine air intake or mock-up incorporating an air screen or air filter; manufacturer's service instructions and the equipment and materials recommended to inspect and service air screens or filters.

Performance:

The student will remove the screen or filter from the airplane or mock-up, inspect, service and reinstall the unit into the engine air intake. He will describe the rigging of the alternate air intake door.

Standard:

Service instructions will be interpreted without error or omission. The completed job will reflect return-to-service standards.

4. Inspect, Check, Service and Repair an Engine Primer System

Given:

An operational engine priming system mounted in an airplane or mock-up, written service instructions pertaining to the inspection, servicing and repair of the system and gaskets, seals and tools normally required in the repair of the system.

Performance:

The student will operate, inspect, service and repair the priming system correcting a fault introduced into the system by the instructor.

Standard:

The system will operate as it was designed to operate and will be free of internal and external leaks.

BLOCK IV - ENGINE EXHAUST SYSTEMS

A. Inspect, Check, Troubleshoot, Service and Repair Engine Exhaust Systems

1. Inspect, Remove, Replace, Adjust and Repair Joints in the Exhaust System

Given:

An aircraft engine with a complete exhaust manifold system, spare replacement sections of manifold, service manual for the specific engine and appropriate tools to inspect an exhaust manifold.

Performance:

The student will inspect the exhaust manifold and a written record of its condition. He will remove, replace and adjust a replacement section of manifold as directed by the instructor. He will interpret information from the service manual and describe the repairs permitted in the exhaust system.

Standard:

The inspection, removal, reinstallation and adjustment of the manifold will be in accordance with the procedures specified in the manual. Correct terminology will be used as a part of the description of repairs.

2. Inspect, Remove and Test Exhaust Heaters

Given:

An exhaust manifold incorporating a cabin or carburetor heater, the manufacturer's service instructions applicable to that specific manifold and heat exchanger assembly.

Performance:

The student will inspect the heater muffs, test the condition of the heat exchanger and make a written record describing the condition of the heater.

Standard:

The inspection, testing and reinstallation will be in accordance with the procedures specified in the service manual. The heater itself need not meet the return-to-service standards. The written record will accurately reflect the condition of the heater.

3. Identify, Inspect and Describe the Operation of the Turbo-Supercharger and Turbo-Compound Engine

Given:

Charts, diagrams or other suitable reference information, components of the turbo-supercharger and turbo-compound systems and the service information applicable to one specific system.

Performance:

The student will distinguish between turbo-supercharging and turbo-compounding of engines. He will describe the operation of both systems and the inspection procedures that would apply to one specific system of a turbo-supercharger.

Standard:

Correct nomenclature and terminology will be a part of all descriptions and explanations. The inspection procedures will be interpreted without error.

4. Describe the Operation and Inspection of Jet Engine Thrust Reversers and Noise Suppressors

Given:

Charts, drawings, diagrams or other visual aids and reference information illustrating and describing the jet engine exhaust nozzle, thrust reversers and noise suppression devices.

Performance:

The student will interpret the reference information and describe the operation and inspection procedures applicable to the nozzle, reversers and silencers of jet engines.

Standard:

Reference information will be correctly interpreted. Correct nomenclature will be used as a part of all descriptions and explanations.

B. Repair Engine Exhaust System Components

1. Recognize Materials Used in Exhaust System Components

Given:

Ten samples of exhaust system components from both piston and jet engines and appropriate reference information describing the design and construction of exhaust system components.

Performance:

The student will identify five exhaust system components by name and use appropriate reference information as a means of determining the materials used in the component.

Standard:

The student will correctly identify five of the ten sample parts by name.

2. Describe Repair Procedures for Exhaust System Components

Given:

Ten samples of exhaust system components for both jet and piston engines and appropriate reference information describing the repair of the components.

Performance:

The student will interpret the information describing the repair of one exhaust system component.

Standard:

The student will correctly interpret the information and describe the repair of one component.

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1. Carburetion. 16mm. 30 min. Black and White. Sound. Jam Handy.

2. Ice Formation on Aircraft. 16mm. 30 min. Black and White. Sound. Jam Handy.

A P P E N D I X

Quinmester Post Test Sample

Quinmester Post Test

Name_____ Date_____ Score_____

1. A metering force is produced in the two forward chambers of the regulator unit of a pressure injection carburetor. What is the name of this force?
    1. The fuel metering force
    2. The air metering force
    3. The idle metering force
    4. The injection metering force

2. What force, normally wasted, drives a turbo-supercharger?
    1. Exhaust gas heat
    2. Cooling air heat
    3. Unburned fuel
    4. Exhaust gas pressure

3. When is it required to install an auxiliary fuel pump?
    1. When a primer pump is not installed
    2. When more than 1/2 p.s.i. is required
    3. Only when a pressure injection carburetor is installed
    4. Whenever gravity feed pressure is insufficient

4. What is the most commonly used type of engine driven fuel pump?
    1. The centrifugal type
    2. The diaphragm type
    3. The sliding vane type
    4. The wobble type

5. Why is a drain valve installed in the housing of the main fuel strainer?
    1. To permit draining of trapped water
    2. To get fuel easily for cleaning purposes
    3. To check the strainer for dirt
    4. To help drain the fuel system

6. Through which metering jet of a float-type carburetor does fuel from the accelerating pump pass?
    1. The idle metering jet
    2. The economizer metering jet
    3. The main metering jet
    4. No metering jets

7. What effect would richening the idle mixture have on idle speed?
    1. No effect whatsoever
    2. It would increase idle speed
    3. It would decrease idle speed
    4. It may increase or decrease idle speed depending on the engine

8. What is the function of the intercooler in a supercharger system?
    1. To prevent detonation in hot weather
    2. To increase volumetric efficiency
    3. To cool the compressed air
    4. To condense moisture out of the air

9. Fuel vapors relieved from a pressure injection carburetor through the vapor eliminators are ducted to what place?
    1. The engine crankcase
    2. A fuel tank
    3. The atmosphere
    4. The discharge nozzle

10. What force opens the fuel head power enrichment valve of a pressure injection carburetor?
    1. Unmetered fuel pressure
    2. Impact air pressure
    3. Metered fuel pressure
    4. Venturi suction

11. What is the function of the regulator fill valve in a pressure injection carburetor?
    1. To control fuel flow from D chamber
    2. To insure idle cut-off
    3. To direct metered fuel pressure to D chamber
    4. To direct metered fuel pressure to C chamber

12. In a pressure injection carburetor, which metering jet is always in use when the engine is running?
    1. The power derichment metering jet
    2. The automatic lean metering jet
    3. The automatic rich metering jet
    4. The power enrichment metering jet

13. What is the function of the poppet valve in a pressure injection carburetor?
    1. To reduce fuel pump pressure to metered fuel pressure
    2. To keep chamber D from becoming flooded
    3. To regulate fuel flow in the carburetor
    4. To prevent rich idle mixtures

14. What is the function of the idle spring in a pressure injection carburetor?
    1. To prevent complete closing of the poppet valve
    2. To speed opening of the poppet valve during acceleration
    3. To assist the air metering force in opening the poppet valve
    4. To keep the poppet valve from opening too much

15. Which of the following is a common type of fuel pressure gauge?
    1. The magnetic type
    2. The spring loaded type
    3. The aneroid type
    4. The bourdon tube type

16. When checking float level in a float-type carburetor, what surface is used to measure the float level?
    1. The top of the discharge nozzle
    2. The parting surface of the float bowl
    3. The top of the float
    4. The bottom of the float chamber

17. In what position must the carburetor be when adjusting or checking float level?
    1. Level along the length of the float chamber
    2. The same as when mounted on the engine
    3. Level in all directions
    4. Level across the narrow direction of the float chamber

18. What is the function of the diffuser in a supercharger?
    1. To change velocity to pressure
    2. To cool the compressed air
    3. To help atomize the fuel
    4. To change pressure to velocity

19. What is the difference between a pressure injection carburetor and a pressure injection system?
    1. The system injects fuel directly into the cylinders
    2. The system injects fuel into the central induction system
    3. The term system is just another way of saying injection carburetor
    4. There is no such thing as a pressure injection system

20. Which of the several types of accelerating pump used on injection carburetors is usually mounted on the adapter unit?
    1. Only those which do not have a discharge nozzle
    2. The vacuum operated type
    3. Those which pressurize the balance chamber
    4. Only the triple diaphragm type

21. What is the minimum metered fuel pressure required to open the discharge nozzle valve of any pressure injection carburetor?
    1. Two pounds per square inch
    2. Three pounds per square inch
    3. Four pounds per square inch
    4. Six pounds per square inch

22. Of the following, which is the most commonly used type of engine driven supercharger?
    1. The roots blower
    2. The centrifugal type
    3. The sliding vane type
    4. The gear type

23. What is the function of a fuel cross feed valve in an aircraft fuel system?
    1. To permit draining of the fuel from one point
    2. To permit fueling both sides of the aircraft from one side
    3. To permit running two engines from one tank
    4. To permit running two engines from one fuel pump

24. Which of the following is the most popular type of fuel selector valve in use today?
    1. The poppet valve type
    2. The plug type
    3. The electric valve type
    4. The cork type

25. What is the most common type of fuel quantity gauge used in transport category aircraft?
    1. Direct reading
    2. Drip stick
    3. Remote reading
    4. Diaphragm type

26. A fuel pressure warning light switch should be adjusted to turn on the light at what pressure?
    1. 1/4 p.s.i. above minimum operating pressure
    2. 1/4 p.s.i. below minimum operating pressure
    3. 1/2 p.s.i. above minimum operating pressure
    4. 1/2 p.s.i. below minimum operating pressure

27. A clogged idle air bleed on a float-type carburetor would have what effect on engine operation?
    1. Uncontrollably rich idle mixtures
    2. Excessively rich cruise mixtures
    3. Very lean take-off mixtures
    4. Uncontrollably lean idle mixtures

28. What indication is commonly used to denote the correct idle mixture?
    1. A 50 r.p.m. rise at idle cut-off
    2. A 25 r.p.m. drop at idle cut-off
    3. A 50 r.p.m. drop at idle cut-off
    4. A 25 r.p.m. rise at idle cut-off

29. How does the economizer metering jet of a float-type carburetor compare in size with the main metering jet?
    1. It is always smaller in size
    2. It is usually the same size
    3. It is normally a little larger
    4. It is the largest jet in the carburetor

30. What is the minimum number of diaphragms found in the regulator unit of a pressure injection carburetor of the PD type?
    1. Six
    2. Five
    3. Four
    4. Three

31. Hose clamps, as used on some fuel system lines, should be tightened to what extent?
    1. As tight as you can make them
    2. To a torque of 25 inch pounds
    3. Finger tight plus three full turns
    4. Finger tight plus half a turn

32. Why must flexible fuel line connections be used between the engine and the firewall?
    1. To make it easier to change the engine
    2. To allow for vibration and engine movement
    3. It is just considered good practice
    4. To reduce the amount of expensive tubing

33. The FAA specifies a minimum size for aircraft engine fuel lines. That size is:
    1. capable of carrying twice the fuel required for take-off
    2. large enough to supply the engine's needs at take-off
    3. 1/8" diameter for each 100 M.E.T.O. horsepower
    4. large enough to prevent vapor lock

34. Fuel should never be drawn directly from the bottom of the fuel tank sump. Why is this?
    1. There is excessive fuel pressure in this area
    2. There might be a possibility of vapor lock
    3. Water might have gathered in this area
    4. Fuel would have to flow uphill

35. Following repair of aircraft fuel tanks they must be tested for leaks. Testing is done using air pressure of
    1. 1 1/2 pounds per square inch
    2. 5 pounds per square inch
    3. 4 1/2 pounds per square inch
    4. 3 1/2 pounds per square inch

36. Which of the following is a form of induction system ice?
    1. Evaporation ice
    2. Atmospheric ice
    3. Expansion ice
    4. All of the above

37. What vertical drop, head, of fuel is required to produce a pressure of one pound per square inch?
    1. 27 inches
    2. 39 inches
    3. 51 inches
    4. 93 inches

38. Most aircraft have a means of heating the air entering the carburetor. What is the purpose of this?
    1. To prevent carburetor ice formation
    2. To prevent cold air from warping the intake valves
    3. To help vaporize the fuel
    4. To prevent detonation

39. How would you determine the correct fuel pressure to use with a particular carburetor?
    1. From the carburetor identification plate
    2. From the engine log book
    3. From the carburetor specification sheet
    4. Ask the shop foremen

40. To what extent may evaporation of the fuel decrease the temperature of the carburetor barrel?
    1. 90° F.
    2. 60° F.
    3. 45° F.
    4. 30° F.

41. Which of the following is the most common warning of the formation of ice in the induction system?
    1. Rising exhaust gas temperature
    2. An increase in engine r.p.m.
    3. An increase in manifold pressure
    4. Loss of power

42. In a pressure injection carburetor, what would happen if the regulator fill valve remained open when the manual mixture control was moved to idle cut-off?
    1. The engine would keep running
    2. The engine would not start after having been stopped
    3. The fuel diaphragm would rupture
    4. Cruise mixtures would be rich

43. What would be the most probable effect if the power enrichment valve spring adjustment nuts were to become loose?
    1. Rich cruise mixtures
    2. Lean take-off mixtures
    3. Lean idle mixtures
    4. No idle cut-off

44. What would be the most probable effect if the gasket between the regulator and throttle units were to leak?
    1. Lean idle mixtures
    2. Rich cruise mixtures
    3. Lean cruise and take-off mixtures
    4. Rich idle mixtures

45. The automatic mixture control of a pressure injection carburetor serves what function?
    1. It regulates venturi suction
    2. It regulates impact air pressure
    3. It regulates metered fuel pressure
    4. It regulates unmetered fuel pressure

46. What is meant by the term "relative humidity"?
    1. Moisture in the air relative to comfort level
    2. Moisture in the air relative to standard day condtions
    3. Percent of dryness of the air
    4. Percent of saturation of air

47. What type of fuel boost pump is always mounted on or in a fuel tank?
    1. Centrifugal type
    2. Sliding vane type
    3. Diaphragm type
    4. Wobble type

48. When testing a pressure injection carburetor on a test bench, how is air flow through the carburetor simulated?
    1. By a combination of venturi suction and regulated air pressure
    2. By a specific pressure in "A" chamber
    3. By controlling fuel inlet pressure
    4. By a specified suction in "B" chamber

49. Where must the main fuel strainer be located in relation to the other parts of the system?
    1. At the most accessible point
    2. At the lowest point in the system
    3. Immediately after the fuel tank
    4. At the highest point in the system

50. A metering force is produced by the two forward chambers of regulator unit in a pressure injection carburetor. What is that force?
    1. The idle metering force
    2. The air metering force
    3. The fuel metering force
    4. The acceleration metering force

KEY TO QUINMESTER POST TEST
9057.02

1.	2	13.	2	25.	1	38.	2
2.	1	14.	3	26.	3	39.	1
3.	4	15.	1	27.	2	40.	3
4.	3	16.	4	28.	1	41.	2
5.	1	17.	2	29.	4	42.	4
6.	1	18.	3	30.	1	43.	1
7.	4	19.	1	31.	3	44.	1
8.	3	20.	1	32.	4	45.	3
9.	3	21.	2	33.	2	46.	2
10.	2	22.	3	34.	1	47.	4
11.	1	23.	2	35.	3	48.	1
12.	4	24.	4	36.	4	49.	4
				37.	4	50.	2